



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE

Southwest Region

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JUN 23 2004

MEMORANDUM FOR: Scientific Research Permit No. 1288, SWR-03-8950:RBD

FROM:

Rodney R. McInnis
Acting Regional Administrator

SUBJECT:

Addendum to the Central Valley Programmatic Biological Opinion for
Scientific Research

I. CONSULTATION HISTORY

Section 10(a)(1)(A) of the Endangered Species Act of 1973, as amended, (ESA) provides the National Marine Fisheries Service (NOAA Fisheries) with authority to grant exceptions to the ESA's "taking" prohibitions for scientific research (see regulations at 50 CFR §222.301 through 222.308, and 50 CFR §224.101 through 224.102). Scientific research or enhancement permits may be issued to Federal or non-Federal entities conducting research or enhancement activities that involve take of ESA-listed endangered or threatened species. Any permitted research or enhancement activities must: 1) be applied for in good faith, 2) if granted and exercised, not operate to the disadvantage of the endangered species, and 3) be consistent with the purposes and policy set forth in section 2 of the ESA (50 CFR §222.303(f)). NOAA Fisheries prepared this addendum to the Central Valley Programmatic Biological Opinion for Scientific Research (Central Valley Research Opinion, NOAA Fisheries 2003a), signed on September 5, 2003, in compliance with section 7(a)(2) of the ESA (16 U.S.C. 1536).

On May 5, 2003, Dynamac Corporation was issued Scientific Research Permit No. 1288 (Permit 1288) authorizing research activities in coastal California streams within threatened Southern Oregon/Northern California Coast coho salmon (*Oncorhynchus kisutch*), Central California Coast coho salmon (*O. kisutch*), Northern California steelhead (*O. mykiss*), Central California Coast steelhead (*O. mykiss*), and California Coastal Chinook salmon (*O. tshawytscha*) Evolutionarily Significant Units (ESUs). On April 24, 2003, Dynamac Corporation submitted a request to NOAA Fisheries for Modification 1 to Permit 1288 to include take of ESA-listed salmonids associated with research in the Central Valley of California. Dynamac's proposed research is within the ESU limits of endangered Sacramento River winter-run Chinook salmon (*O. tshawytscha*), threatened Central Valley spring-run Chinook salmon (*O. tshawytscha*), and threatened Central Valley steelhead (*O. mykiss*). NOAA Fisheries published a notice of receipt of Dynamac's application in the Federal Register for research in the Central Valley on August 18, 2003 (68 FR 49439), announcing the beginning of a thirty-day public comment period. No public comments were received.



II. DESCRIPTION OF THE PROPOSED ACTION

Under the authority of section 10(a)(1)(A) of the ESA, NOAA Fisheries proposes to issue Modification 1 to Permit 1288 authorizing take of Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, and Central Valley steelhead. Modification 1 to Permit 1288 would be in effect through October 30, 2008, and would be subject to the limitations of the ESA and the regulations in 50 CFR parts 222, 223, and 224, for the period stated on the permit unless it is modified, suspended, or revoked sooner.

A. Research Project Description

In a request for Modification 1 to Permit 1288, Dynamac proposes to sample the biological community of the Sacramento, Mokelumne, and San Joaquin Rivers, which are located within the Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, and Central Valley steelhead ESUs. The sampling objective is to determine species presence and relative abundance to estimate the biological integrity of selected river reaches. This survey of California rivers is part of a larger survey (*i.e.*, the Environmental Monitoring and Assessment Program, Western Pilot Study) conducted from 2000 through 2004 of 1,200 rivers and streams in the 12 co-terminous western states. An objective of the survey is to assess the status and trends in the region's surface waters in a statistically and ecologically rigorous manner as mandated by the Clean Water Act, which should lead to more rigorous regulatory enforcement.

The project entails sampling the aquatic biological community for: aquatic vertebrates using electrofishing, macroinvertebrates from kick samples, phytoplankton using vertical tow nets, and brushing rocks and woody debris to collect periphyton. The only sampling method that may adversely affect listed salmonids is electrofishing. Although the other methods may affect fish eggs and larvae, these life stages of listed salmonids do not occur in the proposed sampling reaches.

One reach of each of the three rivers will be sampled. The applicants will make one pass with two, raft-mounted electrofishers to collect fish in each sampling reach. Each electrofisher will be operated by two people as they tow the 14-foot raft while wading. The three sampling reaches will measure 100 times the mean wetted channel width. If any reach is non-wadeable, the researchers will row downstream and sample every 10 channel widths within the reach. Stunned fish will be collected in a soft mesh dipnet and placed in a live well. In some cases, it may be necessary to employ a vertebrate sampling procedure other than raft electrofishing (*e.g.*, in reaches with exceedingly high conductivity or low water levels). When this occurs, Dynamac proposes to use a beach seine targeting the nearshore regions of select rivers. Captured fish will be held only long enough to collect required data (*e.g.*, species identification and length), allowed to recover, and then released. All fish will be released in the general location of capture. Most sites will be sampled only once between April 1 and September 30. However, sites with listed species will be sampled between July 15 and August 15 or as agreed upon with local California

Department of Fish and Game (DFG), U.S. Fish and Wildlife Service (FWS), and NOAA Fisheries staff.

B. Description of the Action Area

The action area includes the sampling reaches in three rivers within the Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, and Central Valley steelhead ESUs. Table 1 lists the streams that are proposed to be sampled in each ESU and provides the approximate location of each sampling reach by longitude and latitude.

Table 1. Locations of three proposed river sampling reaches within the distribution of ESA-listed salmonid ESUs in the Central Valley of California. The length of a sampling reach will measure 100 times the mean wetted channel width.

River Name	County	Location	Latitude	Longitude
San Joaquin River	Stanislaus	Near Merced River confluence	37.3544	120.97591
Mokelumne River	San Joaquin	Northwest of Lodi	38.20950	121.36924
Sacramento River	Butte	Between Butte and Big Chico creeks confluence	39.57528	122.00068

C. Requested Amount of Take

The applicant estimates the proposed study may result in nonlethal take of 5 juvenile Sacramento River winter-run Chinook salmon, 5 juvenile Central Valley spring-run Chinook salmon, and 15 juvenile Central Valley steelhead. The applicant estimates a potential lethal take of 6.8 percent of all captured salmonids that may result in unintentional lethal take of, at most, one juvenile winter-run Chinook salmon, one juvenile spring-run Chinook salmon, and three juvenile steelhead. Given the location and time of the proposed study, NOAA Fisheries recommends adding nonlethal take of six and lethal take of one adult Central Valley steelhead to the requested amount of take.

D. Measures to Reduce the Impacts of Modification 1 to Permit 1288

Research activities authorized under Modification 1 to Permit 1288 may result in take of ESA-listed salmonids. Following are measures that have or will be implemented to minimize any adverse impacts on these salmonids during the research activities:

- a. NOAA Fisheries has reviewed the credentials of the principal investigators for the proposed research. All investigators are well-qualified and are experienced in working with salmonids.

- b. NOAA Fisheries has developed **nondiscretionary** measures for Modification 1 to Permit 1288 that are necessary and appropriate to minimize take and the effect of take on listed salmonids (see Appendices A and B of the Central Valley Research Opinion). The investigators will ensure that all persons operating under Modification 1 to Permit 1288 will be familiar with the measures therein.
- c. NOAA Fisheries will monitor project activities to ensure that the project is operating satisfactorily in accordance with Modification 1 to Permit 1288. NOAA Fisheries will monitor actual annual take of ESA-listed fish species associated with the proposed research activities (as provided in annual reports or by other means) and will adjust annual permitted take levels if they are deemed to be excessive or if cumulative take levels are determined to operate to the disadvantage of the salmonids.
- d. All persons operating under Modification 1 to Permit 1288 will be properly trained and have access to properly maintained state-of-the-art equipment.
- e. All fish captured will be held in live wells in the stream, allowing for water flow-through with ambient oxygen and water temperature levels.
- f. To reduce impacts to adult fish by raft electrofishing, Dynamac will avoid adult salmonids through sample timing, consulting with local biologists, and will cease electrofishing when adults are seen or enter the electrical field. The raft will then float downstream out of the range of the adults before electrofishing resumes.

III. STATUS OF THE SPECIES AND CRITICAL HABITAT

Modification 1 to Permit 1288 may potentially affect Central Valley steelhead, and to a lesser extent may affect Sacramento River winter-run Chinook salmon and Central Valley spring-run Chinook salmon. The recently issued Central Valley Research Opinion describes the status of the Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, and Central Valley steelhead ESUs. The current status of listed salmonids in the Central Valley, based on their risk of extinction, has not significantly improved since the species were listed (NOAA Fisheries 2003b). Although the number of Sacramento River winter-run Chinook salmon has increased in the last six years, the ESU remains at risk of extinction. Sacramento River winter-run Chinook salmon run size declined from a high of approximately 118,000 fish in 1969 to a low of fewer than 200 fish in 1994, and has recently increased to over 9,000 fish in 2002 (DFG 2002). Central Valley spring-run Chinook salmon have displayed broad fluctuations in abundance over time. Their numbers have ranged from lows of approximately 400 in 1966 and 3,000 in 1992 to highs of approximately 38,000 in 1982 and 34,000 in 1998, and recently have numbered nearly 13,000 in 2002 (DFG unpublished data). Central Valley steelhead declined from an average of approximately 11,000 adult fish in the late 1960s and 1970s, to approximately 2,000 fish through the early 1990s (McEwan 2001). Recent estimates from trawling data in the San Francisco-San Joaquin Delta indicate that over 3,600 female steelhead spawn in the Central Valley basin (NOAA Fisheries 2003b).

As discussed in the Central Valley Research Opinion, factors affecting the species and their habitats include: 1) dam construction that blocks previously accessible habitat; 2) water development activities that affect water quantity, water quality, and hydrographs; 3) land use activities such as agriculture, flood control, urban development, mining, and logging; 4) hatchery operation and practices; 5) harvest activities; 6) ecosystem restoration actions; 7) natural conditions; and 8) scientific research. Large dams are present on almost every major tributary to the Sacramento and San Joaquin Rivers, and block salmon and steelhead access to the upper portions of watersheds that represent approximately 80 percent of historical habitat. Water diversions directly entrain fish, and can affect habitat by reducing wetted area and causing water temperatures to increase. Runoff from agricultural, urban, and other sources contains pollutants and suspended sediment, which affects water quality. Hatchery fish can compromise the genetic integrity of wild stocks, and fishing pressure on wild stocks can increase during years of high hatchery production. Habitat restoration projects can temporarily cause disturbance and increased suspended sediment in waterways, but ultimately may increase habitat abundance and complexity, stabilize channels and streambanks, increase spawning gravels, decrease sedimentation, and increase shade and cover for salmonids. Cycles in ocean productivity and drought conditions can have corresponding effects on salmonid life history parameters such as growth, recruitment, and mortality. Scientific research can lead to harm, harassment, and death of listed salmonids, but generally is thought to affect only a small number of fish in this manner. The knowledge gained from scientific research may lead to improved management of listed ESUs, increased population sizes, and consequently increased likelihood of survival and recovery.

The research activities described in this document do not result in any changes or effects to salmonid habitat including critical habitat for Sacramento River winter-run Chinook salmon. Therefore, critical habitat is not likely to be affected by Modification 1 of Permit 1288 and is not considered further in this document.

V. ENVIRONMENTAL BASELINE

The environmental baseline includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in process (50 CFR §402.02). A detailed discussion of the factors affecting the species in each ESU is provided in the Central Valley Research Opinion.

A. Status of the Species in the Action Area

The action area provides migratory habitat for Sacramento River winter-run Chinook salmon and Central Valley spring-run Chinook salmon in the Sacramento River, and for Central Valley steelhead in the Sacramento, Mokelumne, and San Joaquin Rivers.

Adult Sacramento River winter-run Chinook salmon typically migrate through the action area in the Sacramento River from November through June to their spawning grounds in the upper Sacramento River (NOAA Fisheries 1997). Adult Central Valley spring-run Chinook salmon return to spawn in their natal tributaries in the Sacramento basin between February and June (Ward and McReynolds 2001). Furthermore, peak migration of juveniles through the action area in the Sacramento River occurs from October through December for Sacramento River winter-run Chinook salmon and from November through January for Central Valley spring-run Chinook salmon (Snider and Titus 2000a, b, c).

Adult Central Valley steelhead pass through the action area during their upstream migration in the Sacramento River from July through March (Hallock 1989), in the Mokelumne River from August through May (Workman 2003a, Marine and Vogel 2000), and in the San Joaquin River primarily in April (FWS, unpublished data). Because it is often difficult to distinguish resident rainbow trout from steelhead during their juvenile life stage, the majority of data are available for the species, *O. mykiss*. Juvenile *O. mykiss* are expected to be present in the Sacramento River from January through May (Snider and Titus 2000a, b, c), in the Mokelumne River from December through July (Workman 2003b, Vogel and Marine 2000), and in the San Joaquin River from February through June (FWS, unpublished data)

B. Factors Affecting the Species in the Action Area

The Central Valley Research Opinion describes the ongoing activities and historical events that have affected listed salmonids in the Central Valley. In particular, water diversion operations, bank protection activities, and hatchery operations are among the activities that have the largest potential impacts to the populations of listed salmonids in the action area. Namely, water development projects alter historical flow patterns that affect the timing of juvenile outmigration and direction of adult upstream migration of salmonids. Secondly, bank protection reduces natural sinuosity and braiding of the stream channel, which may affect the basic physical habitat structure. And third, the large numbers of salmonid fish released from hatcheries (such as the Feather River and Mokelumne River hatcheries) can pose a threat to wild salmonids through genetic impacts such as inbreeding, and increased competition, predation, and fishing pressure that results from hatchery production.

VI. EFFECTS OF THE PROPOSED ACTION

The purpose of this section is to identify effects on ESA-listed Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, and Central Valley steelhead associated with NOAA Fisheries' issuance of Modification 1 to Permit 1288. However, the proposed research activities would take place July 15 to August 15, and therefore, would coincide with the presence of only one ESU, Central Valley steelhead, in the action area. The proposed activities are expected to least affect Sacramento River winter-run Chinook salmon or Central Valley spring-run Chinook salmon because neither are likely to be present in the action area during the sampling period. Additionally, potential impacts to the Central Valley steelhead

ESU are likely to be minimal given the low densities in which adult and juvenile fish may be present in the action area.

Adult Central Valley steelhead may be present in the action area in the Sacramento River and Mokelumne River during the sampling period. However, the number of fish at either location likely would be low because sampling would be conducted at the start of the adult migration period, which is expected to be July through March in the Sacramento River (Hallock 1989), and August through May in the Mokelumne River (Workman 2003a, Marine and Vogel 2000). Adult steelhead in the action area in the San Joaquin River are unlikely to be present in July and August, as they have been found there primarily in the month of April (FWS, unpublished data).

During the proposed research activities, juvenile *O. mykiss* are expected to be present only in the Mokelumne River portion of the action area, where their peak migration period occurs from December through July (Workman 2003b, Vogel and Marine 2000). Juvenile *O. mykiss* are not likely to be present in the San Joaquin River or Sacramento River because their peak migration does not overlap with the proposed sampling period.

The primary effects of the proposed activities on Central Valley steelhead will be those associated with the electrofishing and handling of fish proposed by this project. These activities generally lead to stress and other sub-lethal effects. A detailed description of the effects associated with general capture, handling, and collection gears (*e.g.*, nets) is found in the Central Valley Research Opinion. A more detailed discussion of the effects from raft electrofishing is discussed below.

A. Adverse Effects Associated with Raft Electrofishing

Dynamac proposes to use raft electrofishing to determine the presence, distribution, and relative abundance of fish species in the Central Valley of California. Anodes are placed in the water and create an electrical field approximately one meter in radius near the surface of the water to capture fish.

Possible effects to fish from electrofishing include bruising if the fish directly contacts electrofisher anodes, and exhaustion from repeated shocking. Electrofishing also has been shown to affect fish physiology (Bouck and Ball 1966, Schreck *et al.* 1976, Mesa and Schreck 1989), stamina (Horak and Klein 1967), behavior (Bouck and Ball 1966, Mesa and Schreck 1989), and growth (Gatz *et al.* 1986, Dalbey *et al.* 1996). However, the effects of electrofishing on fish depend on the life stage, size, and species of fish, and sampling methods employed (*e.g.*, duration of capture and handling sequence, sampling frequency, operator skill, and electrical settings; Nielsen 1998). For example, Kocovsky *et al.* (1997) found no population-level effects on estimated salmonid abundance after eight years of electrofishing surveys, despite the incidence of sublethal spinal injuries through time. Furthermore, although less studied, the effects of electrofishing on juvenile fish primarily are stress-related, compared to the more invasive spinal injuries commonly observed in adult fish (Nielsen 1998).

Dynamac has conducted raft electrofishing since 1997. In the 1997 and 1998 pilot study, raft electrofishing resulted in a mortality rate of 6.8 percent of fish captured. In 2000, raft electrofishing occurred in seven states and resulted in a mortality rate of 5.4 percent of salmonids captured. In 2001, raft electrofishing occurred in nine states and resulted in a 6.4 percent mortality rate associated with capture of salmonids. A large proportion (68 percent) of the salmonid mortalities in 2001 occurred during the first week of training on Oregon rivers. These salmonids were of hatchery origin and since then, Dynamac has taken steps to reduce mortality of salmonids. Dynamac recently trained their crews for electrofishing in spring 2003, and had no mortalities to salmonids during the training period (Gregg Lomnick, Dynamac, pers. comm., June 16, 2003). The repeated sampling conducted by Dynamac indicated no diminution of species richness or individual abundance, suggesting minimal effects at the population and assemblage levels.

B. Beneficial Effects of Modifying Permit 1288

There must be an obvious benefit to the species in order to consider authorizing the intentional capture of ESA-listed species and potential removal of those individuals from the population. The use of ESA-listed species for scientific research is consistent with the purpose of the ESA when the research facilitates recovery of an ESA-listed species. The status reviews for ESA-listed salmonids in the Central Valley lament the lack of data available for making satisfactory management decisions (NOAA Fisheries 1997, Busby *et al.* 1997, NOAA Fisheries 2003b). The lack of reliable and widespread abundance and trend data is in itself a risk factor for salmonids. Access to useful scientific information is essential to implement the ESA adequately. Scientific information is necessary to reduce uncertainty in determining whether a consultation is to be conducted formally or informally; when determining whether a jeopardy threshold is met; or when developing terms and conditions, reasonable and prudent measures, and reasonable and prudent alternatives. Also, monitoring activities can help NOAA Fisheries determine if protective actions are assisting in the recovery of salmonids.

This project has broad significance beyond the action area. The information derived from this work will promote recovery of ESA-listed ESUs. As part of the Environmental Monitoring and Assessment Program, Western Pilot Study, this survey will contribute to a large-scale assessment of the biological integrity of aquatic communities in surface waters as mandated by the Clean Water Act. This, in turn, may reduce the need for listing those aquatic species that are limited by physical and chemical habitat, and increase the recovery potential of those that are listed. In addition, the collection of data on salmonid populations will inform decisions on future management of the species and restoration of habitat for salmonids throughout California.

Information on abundance and population structure are the highest priority data needs for recovery planning and the projects proposed by Dynamac address these data needs. Having data available to resource managers will reduce uncertainty in management decisions.

VII. CUMULATIVE EFFECTS

Cumulative effects are defined in 50 CFR §402.02 as "those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation." Future Federal actions, including the ongoing operation of dams, hatcheries, fisheries, water withdrawals, and land management activities will be reviewed through separate section 7 consultation processes and not considered here. Non-Federal actions that require authorization under section 10 of the ESA, and that are not included within the scope of this consultation, will be evaluated in separate section 7 consultations and not considered here.

A generalized summary of potential cumulative effects that may affect Chinook salmon and steelhead within the action area is found in the Central Valley Research Opinion. The primary cumulative effects of particular relevance in the action area include: increased urbanization, existing State hatchery operations, and ongoing agricultural practices. Increasing human populations place a higher demand in the action area for electricity, water, and land development, which in turn affect water quality and quantity, riparian function, and stream productivity. Introductions of hatchery fish may affect natural stocks of salmonids through increased competition, predation, and fishing pressure, as well as reduced genetic diversity. Agricultural practices contribute to nutrient and pesticide runoff, increase the input of sediment to waterways, and require that water be diverted from rivers for irrigation, which in turn may affect salmonid foraging and rearing needs.

VIII. INTEGRATION AND SYNTHESIS OF EFFECTS

The potential impacts to Central Valley salmonids from this project primarily are expected to be limited to temporary (*i.e.*, nonlethal) impacts to few individuals, most likely to Central Valley steelhead. NOAA Fisheries expects listed salmonid populations to be resilient to these small, temporary impacts because the production potential of each river's spawning and juvenile rearing habitat will not be affected by the proposed project (*e.g.*, accessible aquatic habitat in each stream is expected to remain unchanged by the proposed project). This also should allow the populations to successfully rebound from the small amount of unintentional mortality expected (estimated to be no more than 6.8 percent mortality per site for all fish handled). Therefore, NOAA Fisheries believes this project is not likely to appreciably reduce the numbers, reproduction potential, or distribution of listed salmonids, and therefore is not likely to reduce the likelihood of survival and recovery of the Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, and Central Valley steelhead ESUs.

IX. CONCLUSION

After reviewing the best available scientific and commercial information, the current status of Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, and Central Valley steelhead, the environmental baseline for the action area, the effects of proposed Modification 1 to Permit 1288, and the cumulative effects, it is NOAA Fisheries' biological

opinion that Modification 1 to Permit 1288, as proposed, is not likely to jeopardize the continued existence of Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, and Central Valley steelhead. Critical habitat for Sacramento River winter-run Chinook salmon occurs in the action area, but no destruction or adverse modification of that critical habitat is anticipated.

X. INCIDENTAL TAKE STATEMENT

Section 9 of the ESA and Federal regulations pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and 7(o)(2), taking that is incidental to and not intended as part of the proposed action is not considered to be prohibited taking under the Act provided that such taking is in compliance with this Incidental Take Statement.

The application for Modification 1 to Permit 1288 proposes intentional take of listed Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, and Central Valley steelhead associated with scientific research and monitoring activities. Incidental take of endangered or threatened species is not anticipated. This opinion does not authorize any taking of a listed species under section 10(a) or immunize any actions from the prohibitions of section 9(a) of the ESA.

XI. REINITIATION OF CONSULTATION

This concludes formal consultation on the issuance of Modification 1 to Permit 1288. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: 1) the amount or extent of incidental take is exceeded, 2) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered, 3) the identified action is subsequently modified in a manner that causes an effect to listed species or critical habitat that was not considered in this tiering document or Opinion, or 4) a new species is listed or critical habitat designated that may be affected by the identified action. In instances where the amount or extent of incidental take is exceeded, formal consultation shall be reinitiated immediately.

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